

**AMBIENT AIR QUALITY IMPACT REPORT (AAQIR)  
LSP MORRO BAY, LLC  
(SCC 2005-01)**

This document serves as the statement of basis as required by 40 CFR § 124. This document sets forth the legal and factual basis for permit conditions, including references to applicable statutory and regulatory provisions, including provisions under 40 CFR § 52.21. This document is for all parties interested in the permit.

**I. APPLICANT**

LSP Morro Bay, LLC  
Morro Bay Power Plant  
1290 Embarcadero Road  
P.O. Box 1737  
Morro Bay, CA 93443-1737

**II. PROJECT LOCATION**

LSP Morro Bay, LLC (“LSP Morro Bay” or the “applicant”) has submitted an application for a Prevention of Significant Deterioration (“PSD”) permit for the construction of two new combined cycle gas turbine block units at the Morro Bay Power Plant (“MBPP”) located in Morro Bay, San Luis Obispo County, California. The project is called the LSP Morro Bay LLC Morro Bay Power Plant Modernization Project (“Modernization Project”).

The MBPP is located in the San Luis Obispo County portion of the South Central Coast air basin. This area is either attainment or unclassified for all regulated pollutants: nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), particulate matter less than 10 microns in aerodynamic diameter (PM<sub>10</sub>), and ozone (regulated as volatile organic compounds (VOC) and oxides of nitrogen (NO<sub>x</sub>)). The project’s surrounding area is classified as Class II. The nearest Class I area, approximately 60 miles southeast of the power plant, is the San Rafael Wilderness located in the Los Padres National Forest.

**III. PROJECT DESCRIPTION**

The Modernization Project consists of replacing four existing 1950/1960-era fossil-fuel-fired electric utility steam generators (1002 megawatt [MW] total) with two combined cycle gas turbine block units. Each new block unit will be capable of producing 600 MW. Each new block unit will consist of two General Electric

Frame 7, Model PG7241, 180 MW gas-fired turbines, two heat recovery steam generators with duct burners, and one 240 MW steam turbine.

The Modernization Project also includes, in part, demolition of the existing fuel oil tank farm, demolition of three existing 450-foot exhaust stacks, installation of two new 145-foot exhaust stacks, and refurbishment of the sea-water cooling intake structure.

The new units will be substantially more efficient than the existing units, will use less natural gas and cooling water, will generate more electrical power than the existing units, and will emit significantly less NO<sub>x</sub> and CO than the existing units. See Table 1.

For PM<sub>10</sub> emission control, the applicant proposes good combustion practices and exclusive use of natural gas for each of the emission units.

The San Luis Obispo Air Pollution Control District issued the initial Title V permit to Pacific Gas and Electric Company for the MBPP on February 10, 1998, and issued a renewed Title V permit to Duke Energy Morro Bay, LLC on July 9, 2004. Effective May 4, 2006, company ownership of the MBPP changed from Duke Energy Morro Bay, LLC to LSP Morro Bay, LLC. The MBPP has not been previously permitted by EPA under the PSD program since the existing facility is a grandfathered major stationary source and has not been subject to PSD review prior to the Modernization Project.

#### **IV. APPLICABILITY OF THE PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REGULATIONS**

The PSD regulations (40 CFR § 52.21) define a “major stationary source” as any stationary source belonging to a list of 28 source categories which emits or has the “potential to emit” 100 tons per year (“tpy”) or more of any attainment or unclassified pollutant regulated under the Clean Air Act, or any other source type which emits or has the potential to emit such pollutants in amounts equal or greater than 250 tpy. The existing facility (included in the list of 28 source categories) is a grandfathered major stationary source because it has the potential to emit over 100 tpy of pollutants regulated under the Clean Air Act, but has not previously triggered PSD requirements.

Under the PSD regulations, a major modification is defined as a significant net emissions increase greater than the threshold prescribed for any pollutant subject to the regulation. See 40 CFR § 52.21(a)(2)(iv)(a). The significant thresholds prescribed by the PSD regulations, 40 CFR § 52.21(b)(23)(i), for the subject pollutants are:

<b>Pollutant</b>	<b>Significant Emission Rate (tons/year)</b>
Carbon Monoxide	100
Nitrogen Dioxide	40
Sulfur Dioxide	40
Ozone (regulated as VOC)	40
PM <sub>10</sub>	15

A PSD review would apply to all pollutants from a major stationary source showing significant net increases in emissions for which the applicable federal National Ambient Air Quality Standards (“NAAQS”) have not been exceeded (attainment areas), or areas where the status of the area is uncertain (unclassified). The Modernization Project is located in an area in the San Luis Obispo County portion of the South Central Coast air basin, which currently has a designation of attainment or unclassified for all criteria pollutants.

Table 1 compares emissions from the new turbines and the existing boilers at the MBPP and provides the net emissions change of the Modernization Project:

**Table 1. Comparison of Emissions from New Turbines and Existing Boilers**

	EMISSIONS (tons per year)				
	NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM <sub>10</sub>
New Turbines	292.3	917.4	77.6	23.0	203.2
Existing Boilers	855.4	1436.0	92.1	10.0	127.2
Net Change	(-563.1)	(-518.6)	(-14.5)	13.0	76.0

Table 1 shows PM<sub>10</sub> to be a pollutant for which the proposed emission change exceeds the significance threshold. Therefore, only PM<sub>10</sub> is subject to PSD review and must satisfy the following requirements:

1. Application of Best Available Control Technology (“BACT”);
2. Analysis of ambient air quality impacts from the project;
3. Analysis of air quality and visibility impacts on Class I areas; and
4. Analysis of impacts on soils and vegetation.

## **V. BEST AVAILABLE CONTROL TECHNOLOGY (“BACT”)**

Any major stationary source or major modification subject to PSD review must conduct an analysis to ensure the application of BACT. See 40 CFR § 52.21(j). The federal Clean Air Act (“CAA”) defines BACT as follows:

The term “best available control technology” means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under the CAA emitted from or which results from any major emitting facility. The permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, makes a BACT determination through application of processes and available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each pollutant. In no event shall application of BACT result in emissions of any pollutant which will exceed the emissions allowed by any applicable standard established pursuant to section 111 (“NSPS”) or 112 (“NESHAP”) of the CAA.

EPA has also stated that BACT may be a design, equipment, work practice, operational standard, or combination thereof in the event that EPA determines that emission measurement limitations for a particular unit would make the imposition of an emission standard infeasible. See EPA’s New Source Review Workshop Manual, at page B-56.

The applicant provided a BACT analysis for PM<sub>10</sub>. Particulates emitted from gas turbine trains result, in part, from fuel sulfur, inert trace contaminants, and incomplete combustion of hydrocarbons. The combination of good combustion practices and low or zero ash fuel (i.e., natural gas) is generally considered the top BACT control option for the control of gas turbine PM<sub>10</sub>. Therefore, EPA did not consider other control options. The lowest emission rate will be achieved by the MBPP through exclusive use of natural gas fuel with a sulfur content of no more than 0.25 grains per 100 scf, along with good combustion controls, as BACT for the gas turbines. This method of operating the Modernization Project to control PM<sub>10</sub> emissions is consistent with BACT determinations for other similar facilities in the RACT/BACT/LAER Clearinghouse.<sup>1</sup>

## **VI. AIR QUALITY IMPACTS**

The PSD regulations require that an air quality analysis be performed to determine impacts of the proposed project on ambient air quality. For all regulated pollutants emitted in significant quantities, the analysis must consider

---

<sup>1</sup> PM<sub>10</sub> emissions from cooling towers were not analyzed since the facility will use seawater, not cooling towers, for process cooling.

whether the proposed project will cause a violation of (1) the applicable PSD increments, and (2) the National Ambient Air Quality Standards (“NAAQS”).

*A discussion on the general approach, background air quality, air quality model selection, significant impact levels and de minimis monitoring levels, PSD increment consumption, and compliance with ambient air quality standards is presented below.*

#### **A. Meteorological and Background Ambient Air Quality Data**

The applicant used surface meteorological data collected at the MBPP site during 1994, 1995, and 1996, and upper air data collected from the Vandenburg Air Force Base, 45 miles southeast of the plant site. To evaluate whether the emissions from the MBPP Modernization Project will cause violations of the NAAQS, it is necessary to have available measurements of existing ambient air quality levels in the vicinity of the project site. These levels are needed for each criteria pollutant that will be emitted above the significant emission level, in the case of the MBPP, PM<sub>10</sub>.

The applicant used air quality data for PM<sub>10</sub> from the Morro Bay monitoring station between the period of 1997 to 1999 for the ambient air impact analysis. In addition, because of source air quality impact uncertainties due to complex flow resulting from the land-sea interface, the applicant shall be required to collect ambient air quality data for PM<sub>10</sub> at two separate locations on a standard one day in six day schedule. A plan for performing pre- and post-construction Modernization Project ambient air quality monitoring should be submitted to EPA for approval twenty-four months prior to the first firing of the Gas Turbine units or 90 days following CEC approval of 00-AFC-12, whichever is later. The plan shall include a discussion of monitor siting, quality assurance procedures, and data submission requirements.

#### **B. Air Quality Analysis**

The applicant used EPA-approved dispersion models to perform an analysis of air quality impacts from the proposed project. The Industrial Source Complex Short-Term (ISCST3) was used to predict the worst-case average ambient concentration for PM<sub>10</sub>.

The area was classified as rural, based on the Auer methodology. SCREEN3 was used to simulate maximum ground level concentrations for short term periods under fumigation conditions.

### C. NAAQS Compliance and Increment Consumption Analysis

The estimated ground-level concentrations of the worst case predicted emissions from the facility are presented in Table 2.

**Table 2**  
**Estimated Worst Case Ground Level Concentration<sup>2</sup>**  
(Source – Table 6.2-38 of Application)

Averaging Time	Pollutants ( $\mu\text{g}/\text{m}^3$ )			
	NO <sub>2</sub>	CO	SO <sub>2</sub>	PM <sub>10</sub>
1-hour	----	8615	17.3	----
3-hour	----	----	----	----
8-hour	----	1508	----	----
24-hour	----	----	----	24.2
Annual Average	2.6	----	0.23	2.7

The project net emission increases of NO<sub>x</sub>, CO, and SO<sub>2</sub> do not exceed PSD significance levels, and therefore, an increment and NAAQS analysis is required only for PM<sub>10</sub>. The proposed project impact is above the PSD significance threshold and triggers pre-construction monitoring requirements for PM<sub>10</sub>, increment consumption, and NAAQS analyses under the PSD program regulations. The proposed major modification to the existing major stationary source sets baseline date, and is therefore, the only increment-consuming source in the San Luis Obispo County District. Table 3 and Table 4 below indicate that the source is in compliance with the Class II increment and NAAQS for PM<sub>10</sub>.

**Table 3**  
**Predicted Maximum Modeled Impact and Class II Increments**

Averaging Time	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )		
	Maximum Modeled Impact	PSD Class II Increment	In Compliance with Increment?
24-hour	24.2	30	Yes
Annual Average	2.7	17	Yes

**Table 4**  
**Predicted Maximum Modeled Impact, Background Concentration and NAAQS**

Averaging Time	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )				
	Maximum Modeled Impact	Background	Total Impact	NAAQS	In Compliance with NAAQS?
24-hour	24.2	57	81.2	150	Yes

<sup>2</sup> Values for NO<sub>2</sub>, CO, and SO<sub>2</sub> are included for informational purposes only because these pollutants are not subject to PSD review for this project.

Annual Average	2.7	20.6	23.3	50	Yes
----------------	-----	------	------	----	-----

#### **D. Class I Area Air Quality Analysis**

The only Class I area within 100 km of the project is the San Rafael Wilderness. The modeled results, presented in Table 5 below, indicate that the facility does not consume the Class I increment in the San Rafael Wilderness.

**Table 5**  
**Maximum Predicted 24-Hour Average PM<sub>10</sub> Concentrations in San Rafael Wilderness**

Averaging Time	PM <sub>10</sub> (μ/m <sup>3</sup> )		
	Maximum Modeled Impact	PSD Class I Increment in San Rafael Wilderness	In Compliance with Increment?
24-hour	0.04 (highest second high)	8	Yes
	0.0774 (maximum)		
Annual average	0.009	4	Yes

### **VII. ADDITIONAL IMPACT ANALYSIS**

In addition to assessing the ambient air quality impacts expected from a proposed major modification, the PSD regulations require that certain other impacts be considered. These include impacts on visibility, soils and vegetation, and growth.

#### **A. Visibility Analysis**

The visibility analysis was conducted using ISCST in screening mode to evaluate the impact of the project on San Rafael Wilderness. Table 6 and Table 7 below indicated the modeled maximum concentrations and visibility impact in the San Rafael Wilderness.<sup>3</sup> The maximum visibility impact is within the allowable level of acceptable change to extinction.

<sup>3</sup> NO<sub>3</sub> and SO<sub>4</sub> data shown for informational purposes only.

**Table 6**  
**Maximum Predicted 24 hour Average Concentrations in San Rafael Wilderness<sup>3</sup>**

Class I Area	NO <sub>3</sub> (ug/m <sup>3</sup> )	SO <sub>4</sub> (ug/m <sup>3</sup> )	PM <sub>10</sub> (ug/m <sup>3</sup> )
San Rafael Wilderness	0.0727	0.0086	0.0774

**Table 7**  
**Maximum Visibility Impact in San Rafael Wilderness<sup>3</sup>**

Class I Area	b <sub>NO3</sub> (Mm <sup>-1</sup> )	b <sub>SO4</sub> (Mm <sup>-1</sup> )	b <sub>course</sub> (Mm <sup>-1</sup> )	24-Hour Average Visibility Impact	Percent Change in Extinction	Acceptable change
San Rafael Wilderness	0.5599	0.0706	0.0464	0.6769	4.07	5

#### **B. Soils and Vegetation**

The MBPP has operated and coexisted without incident in proximity to agricultural uses since operations began in the 1950s. Since the new generating facility will be placed within the existing MBPP industrial site and since new operations will result in lower overall criteria pollutant emissions, the Modernization Project will not result in significant impacts to soils and vegetation.

#### **C. Growth**

The Modernization Project will be constructed entirely within the existing MBPP site and consists of the modernization of the existing MBPP facility. In addition, the Modernization Project will not result in the expansion of the existing facility. Therefore, the Modernization Project will not result in significant growth impacts to the surrounding area.

### **VIII. ENDANGERED SPECIES**

Pursuant to Section 7 of the Endangered Species Act (“ESA”), 16 U.S.C. § 1536, and its implementing regulations at 50 C.F.R. Part 402, EPA is required to ensure that any action authorized, funded, or carried out by EPA is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of such species’ designated critical habitat.



EPA consulted with both NMFS and FWS on this project, and EPA's responsibilities under ESA Section 7 have been fulfilled. The conclusions of the Services are provided below:

**A. National Marine Fisheries Service ("NMFS")**

NMFS reviewed the Modernization Project since it occurs in an area where federally threatened steelhead (*Oncorhynchus mykiss*) is present. NMFS concluded that the Modernization Project is not likely to adversely affect steelhead. See May 17, 2002, letter from Rodney R. McInnis, Acting Regional Administrator, NMFS Southwest Region, to Gerardo Rios, Chief, Air Permits Office, EPA Region 9.

**B. Fish and Wildlife Service ("FWS")**

FWS reviewed the Modernization Project and issued a Biological Opinion ("BO") on May 23, 2005. The BO concluded that the Modernization Project, as proposed (including measures specified in the BO), is not likely to jeopardize the continued existence of the federally threatened California red-legged frog, the endangered Morro shoulderband snail, or the tidewater goby. The BO also included reasonable and prudent measures ("RPMs") that are necessary and appropriate to minimize Modernization Project impacts on these species. By letter dated June 23, 2005, Duke Energy Morro Bay LLC (Randall J. Hickok, Vice President, California Assets, to Gerardo Rios) stated that Duke Energy Morro Bay LLC will implement the RPMs, the terms and conditions, and the reporting requirements contained in the BO for the Modernization Project, and will incorporate these requirements into the project description. Duke Energy Morro Bay LLC (now LSP Morro Bay, LLC) submitted the June 23 letter to EPA as an addendum to the PSD permit application.

**IX. TITLE IV (ACID RAIN PERMIT)**

The MBPP is presently an "Acid Rain" source, and will remain so after the Modernization Project. The applicant has submitted a new application for an Acid Rain Permit to the San Luis Obispo Air Pollution Control District.

**X. CONCLUSION AND PROPOSED ACTION**

Based on the information provided by LSP Morro Bay and our review of the analysis contained in the permit application, it is EPA's preliminary determination that the proposed project will employ BACT for PM<sub>10</sub> and will not cause or contribute to a violation of the PM<sub>10</sub> NAAQS, or an exceedance of PM<sub>10</sub> PSD increments. Therefore, EPA intends to issue LSP Morro Bay a permit for the

Morro Bay Power Plant Modernization Project, subject to the permit conditions specified herein. This permit is subject to public review and comment. A final decision on issuance of the permit will be made after considering comments received during the public comment period.